UNCLASSIFIED

AD 400 200

Reproduced
by the

ARMED SERVICES TECHNICAL INFORMATION AGENCY
ARLINGTON HALL STATION
ARLINGTON 12, VIRGINIA

UNCLASSIFIED

NOTICE: When government or other drawings, specifications or other data are used for any purpose other than in connection with a definitely related government procurement operation, the U. S. Government thereby incurs no responsibility, nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use or sell any patented invention that may in any way be related thereto.

400260
AD No.
COPY

JPRS: 16,460

3 December 1962

OTS

ABSTRACTS PERTAINING TO COMMUNIST CHINA IN SOVIET ABSTRACTS JOURNALS

No. 44

(Physics, Mechanics, and Astronomy Series)

U. S. DEPARTMENT OF COMMERCE
OFFICE OF TECHNICAL SERVICES
JOINT PUBLICATIONS RESEARCH SERVICE
Building T-30
Ohio Dr. and Independence Ave., S.W.
Washington 25, D. C.

Price: $3.60

Best
Available
Copy

FOREWORD

This publication was prepared under contract for the Joint Publications Research Service, an organization established to service the translation and foreign-language research needs of the various federal government departments.

The contents of this material in no way represent the policies, views, or attitudes of the U. S. Government, or of the parties to any distribution arrangements.

PROCUREMENT OF JPRS REPORTS

All JPRS reports are listed in Monthly Catalog of U. S. Government Publications, available for $4.50 ($6.00 foreign) per year (including an annual index) from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D.C.

Scientific and technical reports may be obtained from: Sales and Distribution Section, Office of Technical Services, Washington 25, D. C. These reports and their prices are listed in the Office of Technical Services semimonthly publication, Technical Translations, available at $12.00 per year from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Photocopies of any JPRS report are available (price upon request)from: Photoduplication Service, Library of Congress, Washington 25, D. C.

JPRS: 14,460

ABSTRACTS PERTAINING TO COMMUNIST CHINA

IN SOVIET ABSTRACTS JOURNALS

No 44

(Physics Series)
(Mechanics Series)
(Astronomy Series)

This serial publication contains translations of abstracts pertaining to Communist China published in Referativnyy Zhurnal, Fizika (Soviet Abstracts Journal, Physics Series), Nos 5, 6, 7, and 8, 1962; in Referativnyy Zhurnal, Mekhanika (Soviet Abstracts Journal, Mechanics Series), No 11, 1961; and in Referativnyy Zhurnal, Astronomiya (Soviet Abstracts Journal, Astronomy Series), Nos 2, 10, 11, and 12, 1961.

Table of Contents

Page

Physics Series

No 5, 1962

Theoretical Physics 1

Physics of the Atom and Molecule. Spectroscopy 2

Optics. Spectral Analysis. Acoustics 4

High Molecular Substances and Polymers 5

Dielectrics and Semiconductors 8

Kinetics of Crystallization and Recrystallization 9

	Page
Metals	9
Radiophysics	10
No 6, 1962	
Nuclear Physics, Plasma Physics	11
Physics of the Atom and Molecule, Spectroscopy	11
Physical Basis of Electronics	12
No 7, 1962	
Theoretical Physics	13
Physical Phenomena in Living Matter	14
Radiophysics	15
Electron Tubes	16
No 8, 1962	
Dielectric and Semiconductor Polymers	17
Dielectrics and Semiconductors	18
Radiophysics	19
Radioastronomy	20
Mechanics Series	
No 11, 1961	
General Mechanics	21
Hydromechanics	22
Theory of Elasticity	24
Plasticity, Creep, Soil Mechanics	25

Page

Strength of Structures 25

Elasticity and Plasticity 26

Astronomy Series

No 8, 1961

Engineering Geodesy 27

No 10, 1961

Photographic Astrometry 28

No 11, 1961

Astrometry 29

No 12, 1961

General Problems 30

Cosmogeny and Cosmology 31

RZh Fiz, 5-62 Abst #5A221 Physics/ Theoretical Physics/ Thermodynamics and Statistical Physics

CH'EN Ch'un-hsien
CH'EN Shih-kan

"The Method of Simulation in Statistical Physics"

Scientia Sinica, 1961, Vol 10, No 6, 637-652

A presentation of the method of simulation in statistical physics. A detailed comparison is made of the characteristics of statistical simulation system and of those of the original system. Formulas are derived for calculation of mean values of dynamic quantities, and the possibility is pointed out of an extension of this method to the investigation of irreversible processes.

RZh Fiz, 5-62 Abst #5B244 Physics/ Nuclear Physics. Plasma Physics/ Nuclear Reactions

CHOU Te-ling
MAO Chen-ling
YUAN Jung-fang
LIANG Wen-hsueh
CHAO Chung-yao

"Elastic Scattering of 6.8 Mev Protons on Nuclei of Cr, Co, Ni, Cu and Zn"

Scientia Sinica, 1961, Vol 10, No 7, 804-811

A study was made of angular distribution of 6.8 Mev protons elastically scattered on nuclei of Cr, Co, Ni, Cu and Zn. The determinations were made in the region of 20°-165°, at intervals of 5°, a crystal of CsI(Tl) serving as a detector. The angular distributions, presented in the form of $\sigma_{exp}(\theta)/\sigma_{rutherford}(\theta)$ ratio, while generally exhibiting maxima and minima, alter their course from one element to another, particularly over large angles. The 1st maximum of the curves is observed in the 40° region, a minimum -- in the 80° region, the curves

Abst #5B449 (cont'd)

pass through a 2nd maximum only in the case of Co, Cu and Zn ($\sim 130^{\circ}$), only a rise is observed in the case of Ni and Cr. The $\sigma_{exp}(\theta)/\sigma_{rutherford}(\theta)$ ratio, over large angles reaches values of $\sim$ 1.2 for Co and Cu; 1.4 for Zn; 1.9 for Ni and 2.4 for Cr.

RZh Fiz, 5-62 Abst #5C54 Physics/ Physics of Atom and Molecule.Spectroscopy/ Theory of Molecules and Molecular Spectra

HAO Pai-lin
LIU Te-shen
CH'EN Shih-kan

"Energy Spectrum of Pi-Electrons in Long Chains of Conjugated Bonds"

Scientia Sinica, 1961, Vol 10, No 6, 653-675

In LCAO MO approximation, extended to an infinite periodic chain, a study is made of the structure of energy spectrum of pi-electrons of a number of macro-molecules with a conjugated system of bonds. The secular matrix of the problem includes resonance integrals and overlap integrals of different unit cells. To derive the general characteristics of spectrum regularies the structure of the secular equation is discussed in detail. The evolved theory is applied in the study of the spectrum of polynitrile and polymethine chain, and also to chains of the polyphenylene and polyphenylacetylene type. In all of these

Abst #5C14 (cont'd)

cases, the secular equation is solved and functions $\mathbf{G}(k)$ (k -- wave vector) are plotted. The authors arrived at the following conclusions: 1) the taking into account of the geometry of macro-molecule is important and leads to a close correlation between spectrum and structure; 2) most conjugated chains with hetero-atoms have a spectrum of "semiconductor" type (with a slot); hetero-atoms and, for example, benzene rings play an analogous role in the conjugation chain; 3) in the real conjugated systems a spectrum with a slot is the most likely. The authors believe that at present investigations of electron spectra of absorption and of magnetic characteristics of conjugated macro-molecules are more important than the study of their electric conductivity. -- V. Bykhovskiy

---

RZh Fiz, 5-62 Abst #5D267 Physics/ Optics. Spectral Analysis. Acoustics/ Photometry and Colorometry. Sources of Light

BERKOVSKIY A.G.
CHIA KAO

"Focussing of Electrons in Cathode System of Photoelectron Multipliers with Semitransparent Cathodes"

Radiotekhn. i Elektronika [Radio Engineering and Electronics] 1961, Vol 6, No 9, 1588-1590

By the simulation method in an electrolytic cell it is proposed to determine the optimal correlations, for a given design of PEM, of the different parameters which determine the focussing characteristics of electron optical system of PEM with semitransparent cathodes. The method permits a selection of the relationship between these parameters which is best for a given design of the multiplier system. -- Ya. Iman

Abst #5D277 Physics/ Optics, Spectral Analysis, Acoustics/ Photometry and Colorimetry, Sources of Light

VEYNGEROV M.L.
SIVKOV A.A.
PHAN Nang-hue

"Incandescent Lamp with Radiometric Modulator"

Optika i spektroskopiya [Optics and Spectroscopy], 1961, Vol 11, No 6, 780-781

Description of an incandescent lamp, a portion of the radiant flux of which is interrupted by a vane, contained within the bulb of the lamp, which is rotated by action of radiometric forces. The twelve blades of the vane, made of Al foil and mica plates, are coated on both sides with carbon black. The lamp contains nitrogen under a pressure of about 0.01 mm Hg. The correlation is shown between frequency of modulation, vane rotation speed, and power supplied to the incandescent tungsten filament. The curve tends to saturation (corresponding to a modulation frequency of about 400 cps), due to friction forces arising in bearings and gas on rotation of the vane. It

Abst #5D277 (cont'd)

is stated that the saturation effect can be achieved at lower rates of speed by increasing gas pressure within the bulb. -- F. Ortenberg

RZh Fiz, 5-62 Abst #5Zh70 Physics/ High Molecular Substances and Polymers

LI P'ang-t'ung
KAFTANOVA A.S.
BAKIYEV N.F.
KOZLOV P.V.

"Study of Spherolitic Structure of Polymers. V. Effect of the Conditions of Crystallization on Morphology of Microspherolitic Structures"

Vysokomolekul. Soyedineniya [High Molecular Compounds], 1961, Vol 3, No 11, 1734-1738

Poly(ethylene sebacetate) was used to study the influence of the conditions of crystallization of the polymer on morphology of microspherolitic structures. It is shown that depending on conditions of crystallization, the same polymer can form two morphological types of structure, which are detectable with a polarization microscope, between crossed Nicols. The annular morphological type is formed on slow crystallization, the radial type -- on a more rapid crystallization of polymeric

Abst #5Zh70 (cont'd)

substance. For the first time spherolites were obtained which contain both morphological types: the annular structure is formed at the middle of the spherolite, and the radial -- at the periphery. The nature of structural elements of spherolites of the radial morphological type was investigated. It was found that these elements are laminar crystalline formations connected into flat bands which determine the fibrillary nature of the structure of radial-type spherolites. Part IV, see RZh Fiz, 1960, No 10, 24383.

RZh Fiz, 5-62 Abst #5Z54 Physics/ High Molecular Substances and Polymers

LI Li-sheng
ANDRAYEVA N.S.
KARGIN V.A.

"Roentgenographic Study of Polyethylene Monocrystals at Different Temperature"

Vysokomolekul. Soyedineniya [High Molecular Compounds], 1961, Vol 3, No 8, 1238-1242

A study was made of monocrystals of polyethylene, obtained from a 0.01% solution in xylene, in the temperature interval from - 50 to + 135°C. Determinations were made of the coefficient of linear expansion along the a and b axes of the rhombic cell of polyethylene. In the temperature interval of 18.5-115°C the coefficient of linear expansion of b period has the zero value. An evaluation was made of the mean quadratic shift (u^2) of the lattice points of unit cell of polyethylene during thermal vibrations at 18.5° and - 47°C, from the (200) and (400) lines. The difference in magnitude of quadratic

Abst #5Z54 (cont'd)

shift at these temperatures is 0.01 A^2. The data obtained coincide with those secured with samples containing amorphous and crystalline regions. -- A. Volkova

RZh Fiz, 5-62 Abst #5L44 Physics/ High Molecular Substances and Polymers

OUSLV S.S.
SUN T'ung
YERMOLENKO I.N.
ROGOVIN Z.A.

"Investigation of the Structure of Aliphatic Amino Acid Esters of Cellulose and of Grafted Copolymers of Cellulose and Polyamides by Infrared Spectroscopy Methods"

Vysokomolekul. soyedineniya [High Molecular Compounds], 1961, Vol 3, No 11, 1784-1787

A study was made of infrared absorption spectra of cellulose esters of aliphatic amino acids (beta-alanine, epsilon-amino-caproic acid and xi-amino-enathic acid), and also of grafted copolymers of cellulose and acetyl-cellulose with polyamides. The results so obtained confirm the conclusions, previously arrived at on the basis of chemical studies, concerning the structure of these new classes of cellulose derivatives.

RZh Fiz, 5-62 Abst #5L100 Physics/ High Molecular Substances and Polymers

SUN T'ung
OUSLV S.S.
YERMOLENKO I.N.
ROGOVIN Z.A.

"Investigation of the Structure of Aromatic Amino Acid Esters of Cellulose and of Grafted Copolymers of Cellulose and Acrylonitrile by Infrared Spectroscopy Methods"

Vysokomolekul. soyedineniya [High Molecular Compounds], 1961, Vol 3, No 11, 1788-1791

A study was made of infrared absorption spectra of cellulose esters of aromatic amino acids and also of the grafted copolymer of cellulose and acrylonitrile.

RZh Fiz, 5-62 Abst #5F316 Physics/ Dielectrics and Semiconductors

SMOLENSKIY G.A.
CHANG Tsung
SHEN Ye.S.

"Dependence of Initial Permeability of Ferrites with a Garnet-Type Structure on Frequency and Temperature"

Izv. AN SSSR, Ser. Fiz. [Communications of the Academy of Sciences USSR, Physics Series], 1961, Vol 25, No 11, 1402-1407

In the frequency region of 10^4-10^9 cps a study was made of complex magnetic permeability $\mu = \mu' - i\mu''$ of polycrystalline samples and monocrystals of yttrium ferrite-garnet (FG). It was found that in FG of low specific conductance ρ ($\sim 10^6$ ohm·cm) there is observed at room temperature a relaxation mechanism of dispersion of magnetic permeability. On increase of the temperature maximum μ'' is shifted in the direction of higher frequencies. In the state of residual magnetization, μ' decreases considerably in comparison with the absolute-zero

Abst #5F316 (cont'd)

state. In FG with a high ρ ($\sim 10^{10}$ ohm·cm), which is achieved by formation of donor-acceptor pairs, an incorporation of MnO in the ferrites, and by lowering the temperature of sintering of the samples, by an addition of CuO, the maximum of μ'' is shifted to the region of low frequencies on an elevation of the temperature, i.e., a resonance of domain boundaries takes place. The spectra of such a FG in the state of residual magnetization and in the absolute-zero state are practically identical.

N. Smol'kov

RZh Fiz, 5-62 Abst #5F467 Physics/ Kinetics of Crystallization and Recrystallization

YIN Shih-tuan
MEDEL' A.N.

"Electric Characteristics of Amorphous Tellurium Films and the Influence of Admixtures on Conditions of Their Crystallization"

Fiz. Tverdogo Tela [Physics of Solids], 1961, Vol 3, No 12, pp 14-3580

By making use of the sharp change in resistance on a transition from amorphous to crystalline state, it is shown that the temperature of rapid crystallization of amorphous films of Te with an admixture of 0.1 at.% Se remains the same as that of pure Te, while in the case of an admixture of 0.5 at.% I it is lowered 10°. From data of electric conductance of amorphous films of pure Te, and of therm-emf, measured in the interval from -150° to 0°C, were calculated the concentration of holes, of ~10^{17} cm^{-3}, and their mobility of 10^{2} $cm^{2} \cdot v^{-1} \cdot sec^{-1}$.

RZh Fiz, 5-62 Abst #5F492 Physics/ Metals

GALKINA O.S.
CHERNIKOVA L.A.
CHANG K'ai-ta
KONDORSKIY Ye.I.

"Electric Characteristics of Thin Films of Nickel at Low Temperatures"

Zh. Eksperim. i Teor. Fiz. [Journal of Experimental and Theoretical Physics], 1961, Vol 41, No 6, 1763-1766

A study was made of the electric characteristics of thin films of Ni of a very high degree of purity, made by the method of thermal vaporization in vacuum, in a bulb maintained in a helium bath during the film-formation by atomization. Films having a thickness from 30 Å and more had a residual specific electric resistance and Hall emf of an order of magnitude close to those observed for massive samples of Ni.

RZh Fiz, 5-62 Abst #50167 Physics/ Radiophysics

WANG Huan-cho

"Calculation of Matching Metal Insert in a Waveguide of Circular Cross Section"

Radiotekhn. i Elektronika [Radio Engineering and Electronics] 1961, Vol 6, No 7, 1202-1205

A method is proposed for calculation of a metal rod of varying radius, inserted in the tapered intermediate portion between two waveguides of circular cross section and common axis, for the purpose of decreasing the amplitude of H_{02} wave arising when an H_{01} wave is incident to the intermediate portion. A numerical example is given.

RZh Fiz, 5-62 Abst #50275 Physics/ Radiophysics

CH'ING Jung-hao

"Radio-Observations of Diffuse Nebulae Omega (NGC 6618), Laguna (NGC 6523) and Trifid (NGC 6514) in the Decimeter Range"

Astron. Zh. [Astronomical Journal], 1961, Vol 38, No 6, 1069-1073

Results of observations of diffuse nebulae NGC 6618, NGC 6523 and NGC 6514, at frequencies of 1320 and 1500 mc. Radiospectra, dependency of brightness temperature on wavelength, and models, have been derived for these nebulae; optical-range absorption by interstellar dust was determined, and excitations of diffuse nebulae by hot stars are considered.

RZh Fizika 6-62 Abst #6B236 Physics/ Nuclear Physics, Plasma Physics/ Elementary Particles

BARASHENKOV, V.S.
BLOKHINTSEV, D.I.
WANG Jung
MIKHUL, E.K.
HUANG Tsu-chan
HU Shih-k'o

"Inelastic Pion-Nucleonic Interactions at High Energies"

Zh. eksperim. i teor. fiz. (Journal of Experimental and Theoretical Physics), 1962, 42, No 1, 217-223

Peripheral interactions of π-mesons with nucleons are examined in a single-meson approximation. The comparison with experiment of the calculated values of multiplicity of particles produced, angular and energetic distributions of recoil nucleon and its transverse momentum, indicates that at high energies πN-collisions due to $\pi\pi$-interaction predominate.

. . . . . .

RZh Fizika 6-62 Abst #6C350 Physics/Physics of Atom and Molecule. Spectroscopy/Nuclear Quadrupole Resonance

MALYUGHKOV, O.T.
FINKEL'SHTEYN, B.N.
CH'IN I-jang

"Influence of Silver Admixture Upon Nuclear Quadrupole Resonance of Cu^{63} in Cuprous Oxide"

Fiz. tverdogo tela (Physics of Solid Body), 1961, 3, No 11, pp 3534-3535

In a pure cuprous oxide (I) the width of the line of nuclear quadrupole resonance is equal to 18 ke and the 2nd moment $\langle \Delta\nu^2 \rangle = 15.6$ ke. With the increase of the concentration of Ag admixture in I the amplitude of the signal (A) decreases and $\langle \Delta\nu^2 \rangle$ increases. It was shown that one Ag atom brings out of resonance 400 adjoining Cu^{63} atoms. The introduction of about 0.4% Ag into the lattice of I decreases A by about 6 times. -- M.Fedin.

RZh Fizika 6-62 #60375 Physics/ Physical Basis of Electronics

OHIN Tung-hai
NAKAMURA Fukuzo

"Mechanism of Reignition and Quenching of High-Frequency Arcs"

J. Inst. Elect. Engrs Japan, 1961, 81, No 10, pp 1660-1667

[No abstract]

RZh Fizika 7-62 Abst #7A281 Physics/
Theoretical Physics

WANG Jung
HU Shih-k'o

"A Possible Model of Production of the Λ-Particle in a High-Energy Pion-Nucleon Collision"

Zh.eksper.i teor.fiz. (Journal of Experimental and Theoretical Physics), 1961, No 6, pp 1068-1069

On the basis of the model of Λ-particle production in high-energy pion-nucleon collisions suggested by D.Blokhintsev and Wang Jung (RZh Fizika, 1961, 10A242), the following results were obtained: 1) mean-square transverse impulse of Λ-particle depends little on the energy of the incident π-meson and is equal to ~ 400 Mev/c; 2) in the C-system Λ-particles impinge mainly backwards; 3) in the L-system the degree of longitudinal polarization of the Λ-particle is ± v/c, where v is velocity of Λ-

Abst #7A281 (cont'd)

particle. Deductions 1) and 2) agree with experimental data.-- L.Blokhintsev.

RZh Fizika 7-62 Abst #7E182 Physics / Physical Phenomena in Living Matter

KRASNOVSKIY A.A.
YEROKHIN Yu.Ye.
HUNG Yü-ch'iun

"Fluorescence of Aggregated Forms of Bacteriochlorophyll, Bacterioviridin and Chlorophyll in Connection with the State of Pigments in Photosynthesizing Organisms"

Dokl.AN SSSR (Reports of the Academy of Sciences USSR), 1962, 143, No 2, pp 456-459

A comparative investigation of luminescence (L) of artificial aggregated forms of chlorophyll (Ch), bacteriochlorophyll (BCh), bacterioviridin (BV) and protochlorophyll, and their L in vivo, was carried out. All investigated pigments possessed characteristic long-wave L, which, in the opinion of authors, is due to aggregated forms, in contrast to usual fluorescence due to "monomeric" forms of pigments. Thus, at +20° in the region of

Abst #7E182 (cont'd)

850-890 mμ there was detected a weak L of densely packed (after prolonged evacuation) films of BCh. Freezing to -196° led to a considerable increase of the intensity of this L and a shift of the maximum to 910-920 mμ. Adsorbates of BCh on sucrose at +20° revealed a weak L at 810 and 880 mμ. Upon their freezing to -196° there was observed an increase of the intensity and a shift of the maximum of L to 820 and 915 mμ, respectively. Colloidal solutions of BCh had maxima of L in the region of 800 mμ at +20° and in the region of 810-815 mμ at -196°. The films of BCh after prolonged evacuation gave a weak L at ~ 780-790 mμ at +20° and rather intensive L (805-810 mμ) at -196°. Colloidal solutions of BV and its adsorbates on sucrose fluoresced in the region of 780-790 mμ at +20° and at -196° in the region of 780-800 mμ. Hard films of chlorophyll-a had a characteristic maximum of L at -196° for 740-750 mμ. In some cases (with incomplete evacuation of solvent) it was possible to obtain spectra of

Abst #7182 (cont'd)

Ch and BCh having a set of monomeric and aggregated M very close to the spectra of L of leaves or live bacteria. But in model systems it was not possible to obtain the maximum 810-815 mμ which is present in the spectrum of leaves of green plants, and 805-820 mμ, characteristic of spectra of green bacteria. -- O.Rikhireva.

RZh Fizika 7-62 Abst #7316 Physics / Radiophysics / Theory of Oscillations

LEBEDEV, I.V.
CH'EN Chung-mou

"On Possibilities of the Use of Superhigh-Frequency Autogenerators as Feedback Amplifiers. I.Amplifiers Working as Two-Terminal Networks"

Izv.vyssh.uchebn.zavedeniy.Radiotekhnika (News of Higher Educational Institutions.Radio Engineering), 1961, 4, No 5 pp 560-567

The possibilities of feedback amplification with underexcited superhigh-frequency autogenerators connected as feedback amplifiers (with circulators) are discussed. Amplification factors and frequency bandwidths were calculated. The effected calculations show that, taking into account the practical existence of a mismatch, the amplification factor is limited by a value of the order of

Abst #7016 (cont'd)

20-30 db (VSWR $\leq$ 1.2). Whereupon, the bandwidth of such an amplifier may constitute several percent. To widen the passband, it is necessary to select such a design and such operating conditions of the device that the ratio of electron conductivity to the conductivity of the oscillatory circuit be as great as possible. The assurance of a stable amplification range is achieved through the increase of amplifier - load coupling. It is pointed out that the calculations quoted in the article may also be used both for the creation of feedback amplifiers as well as for "hot" measurements in the investigation of the properties of electronic and semiconductor superhigh-frequency autogenerators.--A.Pirogov.

RZh Fizika 7-62 Abst #7-3-50d Physics / Electron Tubes

LEBEDEV, L.V.
CH'EN Chung-mou

"On Possibilities of the Use of Superhigh-Frequency Autogenerators as Feedback Amplifiers. I.Amplifiers Working as Two Terminal Networks"

Izv. vyssh. uchebn. zavedeniy, Radiotekhnika (News of Higher Educational Institutions. Radio Engineering), 1961, 4, No 5, pp 560-567

The calculation formulas of amplification factors and service-frequency bands for a negative conductance feedback amplifier (FA) having one coupling element of the resonance oscillatory system with load are given. The possibilities of obtaining an amplification of 20-30 db at a bandwidth of several percent were examined. The influence upon the value of amplification factor of the possible mismatch

Abst #7-3-50d (cont'd)

as the input of the circulator, situated between FA and load, which isolates the input and output signals, was taken into consideration. The basic deduction from the obtained results is the necessity of preserving in the regime of disrupted oscillations a large value of active negative electron conductance inherent in superhigh-frequency autogenerators. Therefore, the underexcited operating conditions should be ensured not by a decrease of electron current but by an increase of the input load, i.e., by an increase of the relation of inherent Q to the external Q. While designing FA it is necessary to strive to decrease wave conductance of the oscillatory system of the autogenerator on the basis of which FA is created. Bibl.8 titles.

NZh Fizika 8-62 Abst #8E118 Physics/ Dielectric and Semiconductor Polymers

MIKHAYLOV, N.V.
FAYNBERG, E.Z.
GORBACHEVA, V.O.
CH'ENG Ch'ing-hai

"On the Compatibility of Polyethylene-Polypropylene System"

Vysokomolekul.soyedineniya (High-Molecular Compounds), 1962, 4, No 2, pp 237-241

The compatibility of mixtures of polyethylene (PE) and polypropylene (PP) prepared with the same solvent at 160-165°C and through fusion was studied. To investigate the properties of these mixtures, a differential thermal analysis, thermochemical method and method of gradient tube for measuring density were used. For comparison, copolymer data are quoted. According to data of thermal capacity and

Abst #8K118 (cont'd)

density, the highest deviations from additiveness are observed in a combined mixture of polymers of 7.5:2.5 composition; in this case, their most complete compatibility is assumed. Upon transition to incompatible mixtures, the difference between their real density and that which would be in the case of additivity changes sign, which proves the existence of a concentrational limit of compatibility. From the quoted data, it is seen that the compatibility is observed at high PE concentrations (< 75%). A mixture containing almost pure PP (2:98) divides into layers. Compatibility is connected with the plasticising effect of PE on PP due to different flexibility of molecular chains of polymers.--I.Musayelyan.

RZh Fizika 8-62 Abst #8F265 Physics / Dielectrics and Semiconductors / Ferromagnetic Resonance

HSU Yen-sheng

"Spectrum of Short Spin Waves in a Ferrite Core and Sphere"

Radiotekhn. i elektronika (Radio Engineering and Electronics), 1962, 7, No 2, pp 321-327

The spectrum of spin waves in a ferrite cylinder and sphere was examined in a magnetostatic approximation. The expressions for magnetostatic oscillations at sufficiently small wavelengths (of much smaller dimensions than the sample) were obtained. The effect upon the spin-wave spectrum of the dimensions and form of the ferrite sample were analyzed.--N.Potapkov.

RZh Fizika 8-62 Abst #80156 Physics/
Radiophysics

HSU Yen-sheng

"On the Theory of Resonance Ferrite Systems"

Radiotekhn. i elektronika (Radio Engineering and Electronics), 1962, 7, No 3, pp 429-436

Calculations are given for the design of a high-power resonance ferrite rectifier composed of thick ferrite plates partially filling the space between the wide waveguide walls. The solution is arrived at by the method of successive approximations. In the case when the dimensions of the core are large and the magnetic field is parallel to the waveguide walls, different resonance conditions exist for the forward and backward wave. The conditions were derived for round and elliptic cross section of ferrite cores in a rectangular waveguide, taking into account the influence of the walls by the method of mirror

Abst #80156 (cont'd)

reflections. It is noted that, to build rectifiers, it is expedient to use plates with approximately rectangular cross section. In this case the theoretical evaluation of the difference of resonance fields becomes understated.
--G.Postnov.

CHI'IN Jung-hao

"Observation of the Source Sagittarius A at a Frequency of 1500 Mc

Astron. zh.(Astronomical Journal), 1962, 39, No 1, pp 166-168

On the basis of data on the radioemission of the source Sagittarius A at 1500 Mc ($F_\nu = 1260 \cdot 10^{-26}$ wntt/m^2 cps, $\varphi = 0°.37$) obtained by the author, a model was constructed. The evaluation of the star numbers of various spectral classes necessary for the excitation of the source are given.

RZh Mekhanika 11-61 Abst #11A126 Mechanics/General Mechanics/Stability of Motion

CHANG Jen-wei

"Stability of One Nonlinear Regulated System"

Avtomatika i telemekhanika (Automation and Telemechanics), 1960, 21, No 11, pp 1475-1480

The problem of the stability of the following regulation system is being considered

$$T^2\ddot{\psi} + U\dot{\psi} + K(\beta) + \mu = 0, \quad \dot{\psi} - \dot{\beta} - n\beta = 0$$

$$\mu = f(\sigma), \quad \sigma = a\psi + B\dot{\psi} + G^2\ddot{\psi} - \frac{1}{l}\mu$$

where T, U, n, a, B, G, l are constant, and $K(\beta) = k\beta + m\beta^2$, $\sigma f(\sigma) > 0$.

The conditions of stability were realised by a known method as the conditions of sign-fixedness of the derivative function

$$V = \frac{1}{2}\sum_{i,k=1}^{3} B_{ik}\eta_i\eta_k + \frac{1}{2}\sigma^2$$

Abst #11A126 (cont'd)

where $\eta_1 = \psi, \quad \eta_2 = T\dot{\psi}; \quad \eta_3 = \beta, \quad \sum_{i,k=1}^{3} B_{ik}\eta_i\eta_k$

is Lyapunov's function for a linearised system of equations. The conditions of stability were satisfied in the form of two inequalities containing the variable η_3 and are valid if $|\eta_3| < \bar{\eta}_3$.

Abstracter's note: The affirmation of the author that upon fulfilment of the conditions obtained by him the system is stable asymptotically at $|\eta_3| < \bar{\eta}$ and at all kinds of perturbations of η_1, η_2 and σ, is erroneous. The correct evaluation of the field of attraction is given by the inequality $V(\eta_1, \eta_2, \eta_3, \sigma) < \inf V$ at $|\eta_3| = \bar{\eta}_3$ -- B.Rasumikhin.

RZh Mekhanika 11-61 Abst #11B747 Mechanics / Hydromechanics / Dynamic Meteorology

TSENG Ch'ing-ts'ung

"Application of a Complete System of Equations of Thermo-hydrodynamics to Short-Term Weather Prognosis in a Two-Level Model"

Dokl. AN SSSR (Reports of the Academy of Sciences USSR), 1961, 137, No 1, pp 76-78

Basic are two equations of motion and an equation of continuity and heat influx in which temperature is eliminated by means of equations of statics and of Clapeyron,

$$\frac{\partial u}{\partial t} + \frac{\partial \Phi}{\partial x} - lv = -\left(\frac{\partial u^2}{\partial x} + \frac{\partial uv}{\partial y} + \frac{\partial u\tau}{\partial \zeta}\right)$$
$$\frac{\partial v}{\partial t} + \frac{\partial \Phi}{\partial y} + lu = -\left(\frac{\partial uv}{\partial x} + \frac{\partial v^2}{\partial y} + \frac{\partial v\tau}{\partial \zeta}\right)$$

Abst #11B747 (cont'd)

$$\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} + \frac{\partial \tau}{\partial \zeta} = 0$$
$$\zeta^2 \frac{\partial^2 \Phi}{\partial \zeta \partial t} + c^2 \tau = -\zeta^2\left(u \frac{\partial^2 \Phi}{\partial \zeta \partial x} + v \frac{\partial^2 \Phi}{\partial \zeta \partial y}\right)$$

with limiting conditions $\tau = 0$ with $\zeta = 0$ and 1; here, x, y, ζ are spatial coordinates, where $\zeta = p/P$ is the reduced pressure (P is pressure at sea level); t is time; u, v, τ are corresponding velocities; Φ is geopotential; l is a Coriolis parameter; $c^2 = (R^2 T_1/g)(\gamma_a - \gamma)$, where R is the gas constant, T_1 - mean temperature, g - earth's gravitational force, γ_a - dry adiabatic gradient, γ - vertical gradient of temperature (assumed, as usual, c^2 = const). The functions u, v, Φ are found on isobaric surfaces of 250 and 750 mbars and with a view to this the first three equations are recorded at these levels and the last one at the 500 mbar level. Derivatives of ζ and t are replaced by centered divided differences. Nonlinear terms of equations as well as terms connected with l are considered in each

Abst #11B747 (cont'd)

case as known (equal to their value at the end of the previous step in time). Thus, for the six functions

$$U = \frac{1}{2}(u_{000} + u_{100}),\ V = \frac{1}{2}(v_{000} + v_{100}),$$

$$N = \frac{1}{2}(\Theta_{000} + \Theta_{100})$$

$$u = \frac{1}{2}(u_{000} - u_{100}),\ v = \frac{1}{2}(v_{000} - v_{100}),$$

$$\theta = \frac{1}{2}(\Theta_{000} - \Theta_{100})$$

we have obtained six prognostic equations, two of which (for u and v) represent final relations, one of them is the Helmholtz equation, and the other three are Poisson's equations. The time step ends by finding $w_{000} = -(\partial u/\partial x + \partial v/\partial y)$. The scheme was realized by the author using the BESM-2 machine, whereupon as steps for t and x, y were taken δt = 30 min and δs = 300 km.-- V.Fadyshnikov.

. . . . . .

RZh Mekhanika 11-61 Abst #11B671 Mechanics/Hydromechanics

RYZHIK, V.M.
CHARNYY, I.A.
CH'EN Chung-hsiang

"On Certain Exact Solutions of Equations of Nonstationary Filtration of Two-Phase Liquid"

Izv. AN SSSR, Otd. tekhn. n. Mekhan. i mashinostr. (News of the Academy of Sciences USSR, Section of Technical Sciences, Mechanics and Machine Building), 1961, No 1, pp 121-126

An exact solution of the form $\rho(x - Vt)$ of the equation of nonstationary filtration of a two-phase liquid, taking into account capillary and gravitational forces, for the case q = const is given. Here, ρ is saturation of a porous space by a displacing phase, x is the coordinate in the direction of motion, V is constant velocity of propagation of saturation, t is time, q is the velocity of fil-

Abst #11B871 (cont'd)

tration of the mixture. To determine the constant of integration, it is assumed as boundary conditions that $\rho \to \rho_1$ at $\xi \to -\infty$ and $\rho \to \rho_2$ at $\xi \to \infty$. The subscripts 1 and 2 relate, respectively, to the displacing phase and that being displaced. Furthermore, the case is investigated when the displacing phase is formed by a pure liquid. In conclusion, some examples are given of the calculation of the stabilised zone in the case of displacement of water by air and petroleum by water from a hydrophilic porous medium. The results of calculations are given in the form of graphs. Bibl. 6 titles.-- M.Filinov.

RZh Mekhanika 11-61 Abst #11061 Mechanics / Theory of Elasticity

FI Chen-tung
LIU Chia-kan
[illegible] Kuang-kan
TUNG Shih-lin

"The Theory of Elasticity of Sloping Shells of Double Curvature"

Shuxue Jinzhan., 1958, No 7, pp 15-31, 55

[No abstract]

RZh Mekhanika 11-61 Abst #110246 Mechanics / Plasticity, Creep, Soil Mechanics

TU Ch'ing-hua

"Elastoplastic Stressed State in Rotating Disks at High Temperatures"

J. Tsinghua Univ., 1959, 6, No 5, pp 81-96

The known methods of design of nonuniformly heated rotating disks of variable cross section, taking into account the change of elastic and plastic characteristics along with change of temperature, are explained. The method is based on division of the disk into rings and averaging of temperature according to rings. Bibl. 28 titles.-- S.Shesterikov.

RZh Mekhanika 11-61 Abst #110347 Mechanics / Strength of Structures

LIAO Hung-en
CH'EN Hua-li

"Calculation of Stresses in Gravitational Dams by the Net-Point Method"

J. Tsinghua Univ., 1959, 6, No 5, pp 143-154

The results of work showed that the net-point method is especially useful for gravitational loads and designs with variable moduli of elasticity. A detailed description is given of the method of testing materials of models (including measurement of the modulus of elasticity, Poisson's coefficient and creep characteristics) as well as a method of preparation of models.-- From authors' summary.

RZh Mekhanika 11-61 Abst #11G360 Mechanics/ Elasticity and Plasticity

HSIUNG Chien-kuo
LAN Kuei-lu
WU Wan-hsin

"Investigation of Limiting Strength of the Cross Section of Previously Stressed and Normal Reinforced Concrete Elements Subjected to Bending"

Scientia sinica, 1960, 9, No 5, pp 695-718

See Chinese J. Civil Engng, 1959, 6, No 3, pp 169-187.

[No abstract]

RZh Astronomiya 2-61 Abst #2D102 Astronomy/ Engineering Geodesy

LI Ch'ing-hai

"The Error Ellipse of Forward Intersection and the Probability of Longitudinal and Transverse Errors"

Acta geod. et cartogr. sinica, 1959, Vol 3, No 2, pp 116-125

On the basis of the book by Luts "The Breaking Up of Large Structures", the application of the error ellipse in the case of breaking up of engineering structures by forward intersection was examined. The probability of longitudinal and transverse errors computed according to Luts's formulas was found to be equal to 0.63. It is noted that it is desirable to construct the error ellipse with a probability of 0.95. To study the case of multiple intersection, it is suggested to reduce it to a single intersection while maintaining the parameters of the error ellipse.

. . . . . .

RZh Astronomiya 2-61 Abst #2D103 Astronomy/ Engineering Geodesy

"Creation of a Reference Network for Surveying the Region of the Approach Tunnel of the Liu-chia-hsia Hydroelectric Station"

Huanghe jianshe, 1960, No 2, pp 33-34

[No abstract]

RZh Astronomiya 10-61 Abst #10A126 Astronomy/ Photographic Astrometry/ Individual Astrometric Observations

KANAYEV, I.I.
WAN Lai

"Results of Investigation of KIM-3 Device No 550002"

Izv. Gl. astron. observ. v Pulkove (News of the Main Astronomical Observatory in Pulkovo), 1960, Vol 22, No 1, pp 180-183

The results of investigation of divided scales, guide-rules and spiral micrometers of the KIM-3 device No 550002 are given. The authors effected independent determinations of corrections relative to 240 divisions (out of 300) of each of two scales. The comparative square error in this reading of convergence results from two measurers are ± 0.15 μ and ± 0.22 μ, respectively, for x and y scales. The divisions were found to be dis-

Abst #10A126 (cont'd)

tributed very uniformly but the ranges of scales lacked correspondence, which necessitated important corrections of the x scale at extreme divisions (~3 μ). Guide-rules of the scale of the device proved to be of high quality (corrections ranged from +0.7 μ to -1.0 μ); periodic errors of spiral micrometers ranged from -0.8 μ to +0.9 μ. An important shortcoming of the device is the presence of a considerable "ren" in the micrometer (for +2.5 μ/mm). The angle between guide lines was found to be 90° + 22", 8 ± 4".7. The investigation showed that KIM-3 No 550002 is suitable for precision astrophotographic work provided the above-indicated corrections are effected.- A.Nemiro

RZh Astronomiya 11-61 Abst #11A105 Astronomy/ Astrometry

YEH Shu-hua
HSIAO Pao-ch'in

"Note on a Sudden Change of the Earth's Rotation"

Acta astron. sinica, 1960, Vol 8, No 1, pp 68-69

According to the time services of observatories of Purple Mountain and Zi-k'a-wei, with adjunction to the group of four quarts clocks of the Zi-k'a-wei observatory there was noted a sudden change in the velocity of the earth's rotation. This change occurred in the second half of July 1959. The duration of the day decreased by ~0.8 msec.- Auther's summary

RZh Astronomiya 12-61 Abst # 12A4 Astronomy/ General Problems/ History

MAI Tse-tsung

"Some Problems Concerning the History of Astronomy in China"

Chinese J. History Sci., 1960, No 3, pp 53-58

The slow growth of productional forces during millenia of the slave-owning and feudal system in China hampered the development of science, including astronomy. The practical role of astronomy in ancient and medieval China was mostly manifested in the compiling of the calendar. The calendar used was the lunar-solar one in which the alternation of "short" and "long" lunar months and periodical intercalation of a 13th month permitted the coordination of cycles of months with the solar year. In order to render the calendar and chronology more accurate, advance calculations and observations of solar and lunar eclipses were effected. Thus, during the Han dynasty (206 B.C.-A.D.220), 293 solar eclipses were recorded and

Abst #12A4 (cont'd)

during the Sun dynasty (960-1279), 148 solar eclipses were noted. The individual periods of rapid development of astronomy in China occurred during economical upsurges of the country. This happened in the age of "warring kingdoms" (5th-3rd century B.C.), during the Han dynasty and considerably later during the Sun and Yuan dynasties. From the 14th century on, an economical and cultural stagnation began in China, which coincided with the beginning of a rapid economical and cultural development in Europe.

The world outlook of prominent Chinese astronomers reflected advanced philosophical and political ideas for their time. Thus, Ch'ang-Heng (78-139) professed progressive cosmological ideas (he affirmed the infinity of the universe). A striking example of the progressive thought at that time was the theory of a celestial sphere surrounding the earth (also spherical) on all sides. At present, in the new, people's China, the possibilities for the development of astronomy are limitless.- Yu.Perel'

RZh Astronomiya 12-61 Abst #12A659 Astronomy/Cosmogeny and Cosmology

TAI Wen-sai

"Distribution of Angular Momentum in the Solar System"

Acta astron. sinica, 1960, Vol 8, No 1, pp 1-18

The detailed calculations of angular momenta of the quantity of motion of various bodies in the solar system intended for use in cosmogenical investigation are given. The orbital and axial momenta of planets (for various models of internal structure), orbital and axial momenta of satellites (it is assumed that the periods of revolution of satellites are equal to the periods of rotation), orbital momenta of the four largest astereids and orbital momentum of the sun (for various models of its internal structure) are provided. The calculations of the position of the Laplace plane of the solar system and inclinations towards it of the planes of planetary orbits are supplied. Full momentum of the quantity of motion of

the solar system is compared with orbital momenta of a number of visually-double stars and angular momenta of A and B class first-magnitude stars. Full and specific momenta of central bodies and satellites are compared, as well as certain conclusions are drawn concerning the distribution of density and thickness of the protoplanetary cloud at different distances from the sun. Bibl. 12 titles.- From author's summary

- END -

1159; 1015

CSO: 3550-N